REMARKS

Applicants appreciate the interview conducted between Examiner Mary A. Wilczewski and attorney, E. Bradley Gould, on October 6, 2005. The following remarks reflect the discussion during the interview.

Claims 1-7, 10-16, 18, 20-25, and 36-42 appear in the application for the Examiner's review and consideration. Of these, claims 1, 10, and 12 are currently amended, claims 40-42 are newly added, and claims 2, 8, 9, 17, 34, and 35 are newly cancelled without prejudice.

As discussed during the interview, the recitations of claims 2 and 17 have been added to claim 1. Consequently, claims 2 and 17 have been cancelled without prejudice, and claims 8 and 9 have also been cancelled since their recitations are now effectively provided in claim 1. Also, to clarify the scope of claim 1, as discussed in the interview, the splitting is recited as being at the region of weakness, which was implicit in the original claim 17, since the region of weakness was created to facilitate the splitting, and the splitting is conducted so that at least a portion of the matching layer remains on the unfinished wafer with the second layer. Claim 1 is thus directed to providing a composite structure that includes the matching substrate, on which a first strained layer is provided, and on which a second layer of semiconductor material is grown. A region of weakness is created in the matching substrate, and after splitting the composite structure at the region of weakness, the remaining portion of the matching layer is removed from the first layer, and also the first layer is removed from the second layer.

The Office Action presents the argument that while the claims provide for the formation of the region of weakness in a matching substrate, this region is not precluded from spreading to adjacent layers. Consequently, the Office Action proposes a combination of Cheng with Canaperi to allegedly show that it would have been obvious to create a region of weakness in the matching substrate instead of in the strained layer 808 of Cheng.

Furthermore, Cheng specifically teaches the strained layer 808 to be used since the strain makes it weaker, improving a crack propagation along the layer during separation. Thus, the hydrogen atoms must be introduced in Cheng to provide a region of weakness within the strained layer itself. There is no motivation to combine Cheng with the Canaperi teaching, and it is not clear how the proposed combination from the Office Action could even be possible, since the combination would require contrary placements

of the region of weakness. Specifically, while the only purpose for the use of a strained layer in Cheng is to locate the region of weakness therein, it would be contrary to the teaching of Cheng and defeat its intended purpose to create the region of weakness in a different part of the composite structure, such as in a matching layer. Consequently, the combination of Canaperi with Cheng to allegedly provide the region of weakness in a matching layer and not in a strained layer directly contradicts the teaching of Cheng. For this reason, there is no motivation to combine the references as alleged, and the references do not suggest or teach the invention of claim 1.

With respect to the office action's argumentation that the region of weakness could be spread to other layers, claim 1 defines that at least a portion of the matching layer remains with the strained layer after splitting. Thus, even if the region of weakness were to "spread" to the matching layer while formed in the strained layer, then none of the matching layer would remain with the strained layer after the split since the split would still occur in the strained layer, where the region of weakness is created. As can be seen, no combination of Cheng and Canaperi would produce the desired method.

Furthermore, as discussed during the interview, the Applicants have found that providing a strained layer in addition to a remaining portion of the matching layer, which are each then removed, provide a far superior surface remaining on the second layer, which has significantly improved smoothness and uniformity compared to what was possible in the prior art. One reason for this is because removal processes can be used that are configured to remove the matching layer preferentially over the strained first layer and that are selected to remove the strained first layer preferentially over the second layer. For example, if a removal process is used that removes the remaining portion of the matching layer at ten-times the rate at which it would remove the first layer, any imperfections in the original surface of the matching layer caused by splitting the composite structure would only be one tenth as deep in the strained first layer. Thereafter, if a removal process is used to remove the first layer, for example with a selectivity such that the first layer of material is removed at ten-times the rate at which the underlying second layer is removed, then the irregularities that remained on the surface of the first layer after the remaining portion of the matching layer was removed would be present in the second layer at only one tenth of the depth of what they were in the first layer. Consequently, the depth of the irregularities that ultimately remain in the second layer would only be one hundredth of the depth of the irregularities that were originally present in the remaining portion of the matching layer after splitting. The use of the

strained first layer, which is intended for removal after the splitting, has particularly been found to provide a surprisingly high quality surface of the second layer after its removal and to allow an increased selectivity compared to relaxed layers.

On the contrary, in Cheng, no additional layer is provided to be removed before the strained layer is removed, and thus, if a removal process with a selectivity of 10:1 is used to remove the strained layer, the irregularities that remained on the surface of the strained layer after splitting would be ten-times as deep as they would be with the present invention. Thus, the presently claimed invention also provides surprising advantages over the cited references, and claim 1 is thus patentable thereover.

It is noted that claims 18, 37, 39, 41, and 42 recite the most preferred method of removing each of the remaining matching layer portion and the first layer, which is by etching and claim 40 specifies that selective removal processes are used. The selective removal of each of the remaining matching layer portion and the first layer is supported, for example, on page 8, lines 13-17 and page 13, lines 22-29, which explain that using selective removal processes effectively provides the strained layer as an etch-stop layer, which as described above, has been found to be particularly effective. These claims are also patentable over the prior art for the reasons discussed above.

As further discussed during the interview, claims 23, 24, and 38 are also patentably distinct from the references since they define that the region of weakness is provided at a depth sufficient for preventing damage thereby to the second layer. As shown in Fig. 8 of the application, and the description thereof, when the region of weakness is formed, a damaged region 13 becomes formed adjacent thereto, which is known in the art to have a relatively large thickness of around 1,500 Å when hydrogen ion implantation is used. These claims effectively recite that the region of weakness not only is to be outside of the strained layer, but also far enough from the strained layer and the second layer to prevent damaging the second layer by the creation of the region of weakness. To put the thickness of the strained layer into perspective, as disclosed on page 10, lines 19-23, of the application, strained layers are typically around 200 Å or thinner, but once a critical thickness is exceeded, the strain becomes relieved. A surprising result compared to the references is that this positioning of the region of weakness further significantly improves the quality of the surface of the second layer that is provided after removal of each of the remaining matching layer portion and the first layer, compared to placing the region of weakness closer to the first layer, and thus to the

second layer. Again, even if the region of weakness were to somehow spread from the strained layer to a matching layer, the positioning within the thin strained layer would still damage the second layer, producing a substantially lower quality finish on the second layer surface that with the claimed method. For these reasons, claims 23, 24, and 38 are also patentably distinct over the references.

In view of the foregoing, the entire application is believed to be in condition for allowance, early notice of which would be appreciated. Should the Examiner not agree, then a personal or telephonic interview is respectfully requested to discuss any remaining issues in an effort to expedite the allowance of this application.

Respectfully submitted,

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